

What is claimed is:

- 1        1. A method of performing a resource action on a resource in a clustered  
2 computer system of the type including a plurality of nodes and a plurality of cluster  
3 objects resident on at least a portion of the plurality of nodes, wherein the plurality of  
4 nodes and the plurality of cluster objects are each capable of owning a resource, the  
5 method comprising:
  - 6                (a) acquiring a lock on each active node among the plurality of nodes;
  - 7                (b) modifying a node configuration parameter for each active node  
8 among the plurality of nodes, such that any inactive node among the plurality  
9 of nodes is thereafter blocked from being accepted into the clustered computer  
10 system;
  - 11                (c) modifying an object configuration parameter on each active cluster  
12 object that could own the resource, such that any inactive cluster object that  
13 could own the resource is thereafter blocked from being accepted into the  
14 clustered computer system, and such that any inactive node is thereafter  
15 blocked from accepting an active cluster object;
  - 16                (d) performing the resource action on the resource after the lock is  
17 acquired and the node and object configuration parameters are modified; and  
18                (e) releasing the lock on each active node after performing the  
19 resource action.
- 1        2. The method of claim 1, further comprising determining that all cluster  
2 objects that could own the resource are active.

1       3. A method of performing a resource action in a clustered computer system  
2 of the type including a plurality of resources and a plurality of cluster entities  
3 configured to own the plurality of resources, the method comprising:

4           preparing the clustered computer system prior to performing the  
5 resource action by modifying at least one cluster configuration parameter  
6 associated with the plurality of cluster entities in the clustered computer  
7 system such that any cluster entity that is active during preparation of the  
8 clustered computer system accepts the modification to the cluster  
9 configuration parameter, and such that any cluster entity that is inactive during  
10 preparation of the clustered computer system does not accept the modification  
11 to the cluster configuration parameter; whereby any such inactive cluster entity  
12 is thereafter blocked from being accepted into the clustered computer system.

1       4. The method of claim 3, wherein the plurality of cluster entities includes a  
2 plurality of cluster nodes.

1       5. The method of claim 4, wherein the cluster configuration parameter  
2 includes a cluster identifier stored in each of the plurality of cluster nodes.

1       6. The method of claim 3, wherein the plurality of cluster entities includes a  
2 plurality of cluster objects.

1       7. The method of claim 6, wherein the cluster configuration parameter  
2 includes an object identifier and an ownership transfer count associated with each of  
3 the plurality of cluster objects.

1       8. The method of claim 3, further comprising performing a resource action  
2 after preparing the clustered computer system.

1       9. The method of claim 8, wherein performing the resource action comprises  
2 performing a resource recovery operation.

1        10. The method of claim 9, wherein the resource action comprises recovery of  
2 a resource selected from the group consisting of virtual address range, cluster object  
3 number, direct access storage device (DASD) number, and combinations thereof.

1        11. The method of claim 9, wherein the plurality of cluster entities comprises  
2 a plurality of nodes and a plurality of cluster objects resident on the plurality of nodes,  
3 and wherein performing the resource recovery action comprises:

4                (a) querying the plurality of nodes in the clustered computer system to  
5 determine which of a plurality of resources are owned; and  
6                (b) transferring ownership of any unowned resources to a first node  
7 among the plurality of nodes.

1        12. The method of claim 8, wherein preparing the clustered computer system  
2 includes obtaining a lock on the clustered computer system prior to modifying the  
3 cluster configuration parameter.

1        13. The method of claim 12, further comprising releasing the lock after  
2 performing the resource action.

1        14. The method of claim 3, wherein the cluster configuration parameter  
2 includes a value pair, and wherein modifying the cluster configuration parameter  
3 includes sequentially modifying each value in the value pair.

1        15. The method of claim 3, wherein preparing the clustered computer system  
2 includes starting a cluster protocol.

1        16. The method of claim 3, wherein preparing the clustered computer system  
2 includes detecting missing cluster entities capable of owning a resource to be acted  
3 upon by the resource action.

1        17. An apparatus, comprising:

2                (a) a memory;

3                (b) a plurality of resources;

4                (c) a plurality of cluster entities resident in the memory and configured  
5                to own the plurality of resources; and

6                (d) a program configured to perform a resource action on at least a  
7                subset of the plurality of resources in the clustered computer system, and to  
8                prepare the clustered computer system prior to performing the resource action  
9                by modifying at least one cluster configuration parameter associated with the  
10                plurality of cluster entities in the clustered computer system such that any  
11                cluster entity that is active during preparation of the clustered computer system  
12                accepts the modification to the cluster configuration parameter, and such that  
13                any cluster entity that is inactive during preparation of the clustered computer  
14                system does not accept the modification to the cluster configuration parameter;  
15                whereby any such inactive cluster entity is thereafter blocked from being  
16                accepted into the clustered computer system.

1        18. The apparatus of claim 17, wherein the plurality of cluster entities  
2        includes a plurality of cluster nodes and a plurality of cluster objects.

1        19. The apparatus of claim 18, wherein the cluster configuration parameter  
2        includes a cluster identifier stored in each of the plurality of cluster nodes, and an  
3        object identifier and an ownership transfer count associated with each of the plurality  
4        of cluster objects.

1        20. The apparatus of claim 18, wherein the program is configured to perform  
2        the resource recovery action by querying the plurality of nodes in the clustered  
3        computer system to determine which of a plurality of resources are owned, and  
4        transferring ownership of any unowned resources to a first node among the plurality of  
5        nodes.

1        21. The apparatus of claim 17, wherein the program is configured to perform  
2 the resource action by performing a resource recovery operation on a resource selected  
3 from the group consisting of virtual address range, cluster object number, direct  
4 access storage device (DASD) number, and combinations thereof.

1        22. The apparatus of claim 17, wherein the program is further configured to  
2        prepare the clustered computer system by obtaining a lock on the clustered computer  
3        system prior to modifying the cluster configuration parameter, and releasing the lock  
4        after performing the resource action.

1           23. The apparatus of claim 17, wherein the cluster configuration parameter  
2 includes a value pair, and wherein the program is configured to modify the cluster  
3 configuration parameter by sequentially modifying each value in the value pair.

1           24. The apparatus of claim 17, wherein the program is further configured to  
2        prepare the clustered computer system by starting a cluster protocol.

1           25. The apparatus of claim 17, wherein the program is further configured to  
2    prepare the clustered computer system by detecting missing cluster entities capable of  
3    owning a resource to be acted upon by the resource action.

1 26. A clustered computer system, comprising:

2 (a) a plurality of nodes coupled to one another over a network;

3 (b) a plurality of resources;

4 (c) a plurality of cluster entities configured to own the plurality of

5 resources; and

6 (d) a program resident on a first node among the plurality of nodes, the

7 program configured to perform a resource action on at least a subset of the

8 plurality of resources, and to prepare the clustered computer system prior to

9 performing the resource action by modifying at least one cluster configuration

10 parameter associated with the plurality of cluster entities such that any cluster

11 entity that is active during preparation of the clustered computer system

12 accepts the modification to the cluster configuration parameter, and such that

13 any cluster entity that is inactive during preparation of the clustered computer

14 system does not accept the modification to the cluster configuration parameter;

15 whereby any such inactive cluster entity is thereafter blocked from being

16 accepted into the clustered computer system.

1        27. A program product, comprising:

2                3        (a) a program configured to perform a resource action in a clustered  
3        computer system of the type including a plurality of resources and a plurality  
4        of cluster entities configured to own the plurality of resources, and to prepare  
5        the clustered computer system prior to performing the resource action by  
6        modifying at least one cluster configuration parameter associated with the  
7        plurality of cluster entities in the clustered computer system such that any  
8        cluster entity that is active during preparation of the clustered computer system  
9        accepts the modification to the cluster configuration parameter, and such that  
10       any cluster entity that is inactive during preparation of the clustered computer  
11       system does not accept the modification to the cluster configuration parameter;  
12       whereby any such inactive cluster entity is thereafter blocked from being  
13       accepted into the clustered computer system; and  
14                (b) a signal bearing medium bearing the program.

1        28. The program product of claim 27, wherein the signal bearing medium  
2        includes at least one of a recordable medium and a transmission medium.

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